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## SOME NOTES ON LIVING STROMBUS PUGILIS.

BY HAROLD SELLERS COLTON.

In the latter part of January a severe norther east many individuals of *Strombus pugilis* upon the beach of Sand Key near Clearwater Harbor, Florida. I sent many north to Dr. Burnett Smith, of the University of Pennsylvania, who had intended to determine if there was a case of sexual dimorphism in this species. Circumstances preventing him from touching the material for the present, he persuaded me to work upon it. The results of my measurements were published in the March NAUTILUS. As the natural history of the Mollusca is so little known, I hope a few notes of my observations will not be out of place.

*Strombus pugilis* is very hardy and easily transported. I expressed alive twenty-five individuals in a starch box. Each one I wrapped in dry newspaper; two weeks afterward, and a week and a half after they had rested in a warm room, a number were yet alive and none had as yet begun to decompose. Another lot I packed in damp seaweed and four days afterward I unpacked them and placed them in an aquarium in Philadelphia. They started to crawl about at once. When I left Philadelphia in the early part of June one was yet alive. Several were killed by the starfish and the others lived for four months and then died from unknown causes.

I had occasion to break open a number of the shells with a hammer in order to remove the soft parts for anatomical purposes. This I found a very difficult task. The shell is so resisting that many blows in the same place were required to make even a small hole. This

great strength of shell shows how well they are protected to withstand the surf of the exposed beach.

On such a beach *Strombus pugilis* is the most common visible Gasteropod in the winter. Others may be abundant at other seasons of the year. I found none alive nor did I find a dead shell within the still waters of Clearwater Harbor, although the flats and bottom were composed of sand as is the outside beach; and a series of extremely low tides allowed me to traverse miles of bottom not ordinarily exposed at low tide. Since they are cast up by the surf in large numbers in a storm they must be abundant just beyond the breaker line.

Within the mantle cavity I found a species of oyster crab that Miss Rathbun has given the name of *Pinnotheres strombi*. A comensal of this sort I believe is unique in a Gasteropod shell.

Every collection of tropical marine shells contains the shells of *Strombus*. The bright colors exhibited by most of the species are perhaps its chief attraction. Its activity when alive is noted all through the literature. Not alone are its movements described but pages are covered with beautiful colored drawings of the animal. Most of the activities have been described from animals under abnormal conditions, and the drawings made from animals out of the water. Nowhere can I find a sketch nor a description of the animal in a living attitude.

Locomotion in *Strombus* and its allies is peculiar. This is due to the structure of the foot. The operculum has changed from an organ of protection to one of locomotion. Situated as in most Gasteropods on the dorsal surface of the metapodium, it is peculiar because it is joined to the foot by about one-third of its surface. The two-thirds free extends downward and in a posterior direction, with its slender point turned toward the left side. The propodium and mesopodium compose one-sixth the ventral surface of the foot, the rest is metapodium.

I quote from the voyage of the "Astrolabe:" "Le form particulier de leur pied ne permet pas de marcher comme les Gasteropodes. Ne peuvent pas ramper ils sautent en prenant un point fixé sur le sol à l'aide de leur opercule." Adams in the voyage of the "Samarang" describes their method of locomotion as rolling over and over. Both of these observations are founded on fact; the former was observed in the water and the latter on land.

By placing them very close to the glass of the aquarium I was able to observe their movements with some detail. When preparing to move they extend their propodium in an anterior direction, at the same time contracting their metapodium (Plate III, fig. 11). They bend the anterior end of their propodium down into the sand, and as the natural position of the operculum is downward and backward at an angle, when the metapodium is thrust out, the operculum sinks into the sand. With the propodium and operculum as anchors the heavy shell is slid forward (Plate III, fig. 12). Sometimes I have seen them project the end of their metapodium out as far as the tip of the spire. The movement is about an inch and a half per step. The track is represented by a series of little ridges. There is a depression on the edge of the lip of the aperture that would on a superficial examination seem to correspond to the anterior siphon canal that is found in many Gasteropods. Through this groove the right eye-stalk protrudes, and the left eye-stalk comes through the true groove of the anterior siphon canal, although no fold of the mantle extends beyond the interior of the shell. (Plate III, fig. 13.)

The sight of this mollusk is remarked on in almost every account of it. It was my own experience that they would draw within their shell whenever I came within four feet of the aquarium. They also react to a jar. They react definitely when a solid object is passed between them and the source of light. Just how keen their sight really is I was unable to determine.

All the time I had them in the aquarium I never succeeded in getting one to eat. I tried fresh oyster meat and oysters that were opened and placed in salt water for two or three days. I also tried raw beef. It is described as a "buzzard among mollusks," but I was not able to observe it feed. When crawling in the sand it swings its proboscis from side to side like an elephant, sometimes dipping the tip into the sand and working its powerful radula. But I could never observe the presence of food of any kind. In the four months I had them in captivity they did not seem to waste away appreciably.

*Strombus* is a very interesting mollusk, and would repay study in several fields. Its hardness assures its easy transportation, and it will live months in confinement. Its eye is wonderfully well adapted to study the histology of the Gasteropod eye, as it can be preserved without distortion. The large size, abundance and bright colors of the shell make it a conspicuous object on the beach.

## LITERATURE.

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 A NEW CHITON FROM THE NEW ENGLAND COAST.

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 BY WILLIAM HEALEY DALL.
 

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Mr. Dwight Blaney of Boston, while dredging in twenty fathoms off Ironbound Island on the Maine coast, was fortunate enough to discover a species of Chiton which, after comparison with Northeast American and North European species, appears to be new.

Seven species of Chitonidæ are known from the coast of New England in less than 100 fathoms. All these have been known for many years. One Arctic species is reported from the Gulf of St. Lawrence and may reach the Maine coast. Besides these there are two species known only from abyssal water in the North Atlantic, not from the coast and not properly belonging to the New England fauna. It is therefore a matter of more than common interest to have a new species discovered, and, because the circulation of the Proceedings of the Biological Society of Washington may probably not reach the mass of malacologists, it was thought desirable to reprint the diagnosis here and add to it a careful illustration of the type.

TONICELLA BLANEYI Dall. Plate IV. Proc. Biol. Soc. Wash., xviii, 1905, pp. 203-4, Sept. 2, 1905.

Shell of a deep rose-color, with fine white lineations and reticular markings; girdle brown, apparently naked, but exhibiting under high magnification a microscopic granulation with a row of small spinules at the extreme edge, as in *T. marmorea*; the coloration of